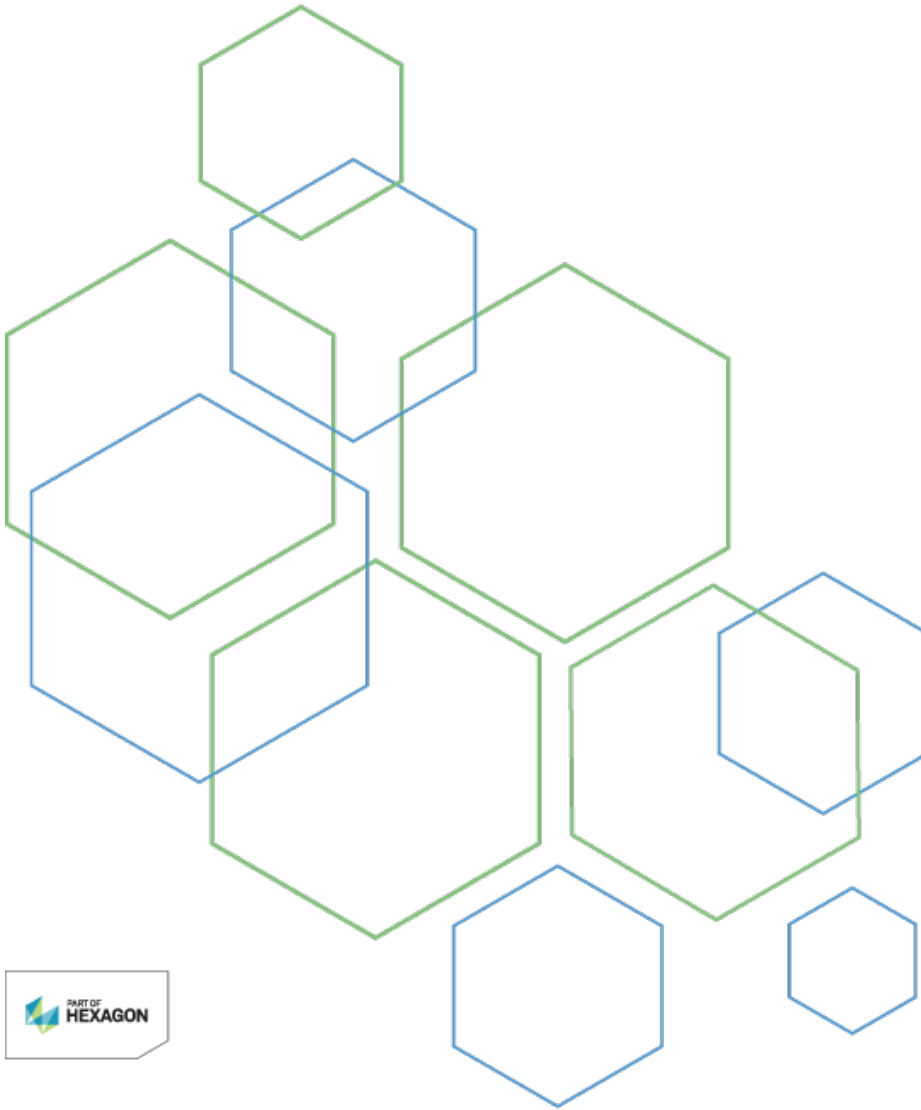


INTERGRAPH®
Smart ➞ **3D**
Point Cloud
User's Guide



Version 2016 (11.0)
November 2016

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Preface

This document is a user's guide for the Point Cloud functionality of Intergraph Smart™ 3D and provides command reference information and procedural instructions.

Documentation Comments

For the latest support information for this product, comments or suggestions about this documentation, and documentation updates for supported software versions, please visit *Intergraph Smart Support* (<https://smartsupport.intergraph.com>).

What's New in Point Clouds

The following changes have been made to the *Point Cloud User's Guide*.

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- You can now register each point cloud vendor separately for a particular model database. Multiple vendors can be registered or unregistered. For more information, see *Reference a Point Cloud* (on page 10). (P1 CP:262721)
- You can now register the point cloud project file using the **Point Cloud Properties** dialog box in Project Management. This helps you to load the point cloud project as the default file directly in Smart 3D while defining the workspace. However, you can choose to load other point cloud projects using the **Open Project** or **Import Point Cloud Data** commands in the **CloudWorx** menu bar. This saves lot of time for multiple users working on a common project. The software no longer prompt you for point cloud source while defining the workspace in Smart 3D. (P2 CP:25600)
- When you reopen a saved Smart 3D session file that contains the CloudWorx project, then the project file that is saved with the session is opened by default. This is not applicable when you reopen a session file that contains ModelSpace View. (P2 CP:25600)
- Added **Show/Hide Point Cloud** and **Snap On/Off on Point Cloud** commands to **CloudWorx** menu bar. For more information, see Show/Hide Point Cloud and Snap On/Off on Point Cloud sections in the *CloudWorx for Smart 3D User's Guide*. (P2 CP:244245)
- You can now register (attach) point cloud models at the satellite location. For more information, see Point Cloud Properties Dialog Box section in the *Smart 3D Project Management User's Guide*. (P2 CP:251950)
- You can now move or rotate the attached point cloud in the Project Management. For more information, see Reference a Point Cloud section in the *Smart 3D Project Management User's Guide*. (P2 CP:251950)
- The **Import ModelSpace View** command has been replaced with **Import Point Cloud Data**. This command allows you to import Cyclone point cloud data (that is ModelSpace View) or import JetStream projects into Smart 3D. For more information, see Import Point Cloud Data section in the *CloudWorx for Smart 3D User's Guide*. (P2 CP:279959)
- To improve point cloud rendering performance, the software now supports **JetStream** to load the point cloud data into Smart 3D. For more information, see Import Point Cloud Data section in the *CloudWorx for Smart 3D User's Guide*. (P2 CP:279959)

- A new command, **Modify JetStream Server and Port**, has been added to the **CloudWorx** menu. For more information, see Modify JetStream Server and Port section in the *CloudWorx for Smart 3D User's Guide*. (P2 CP:284234)

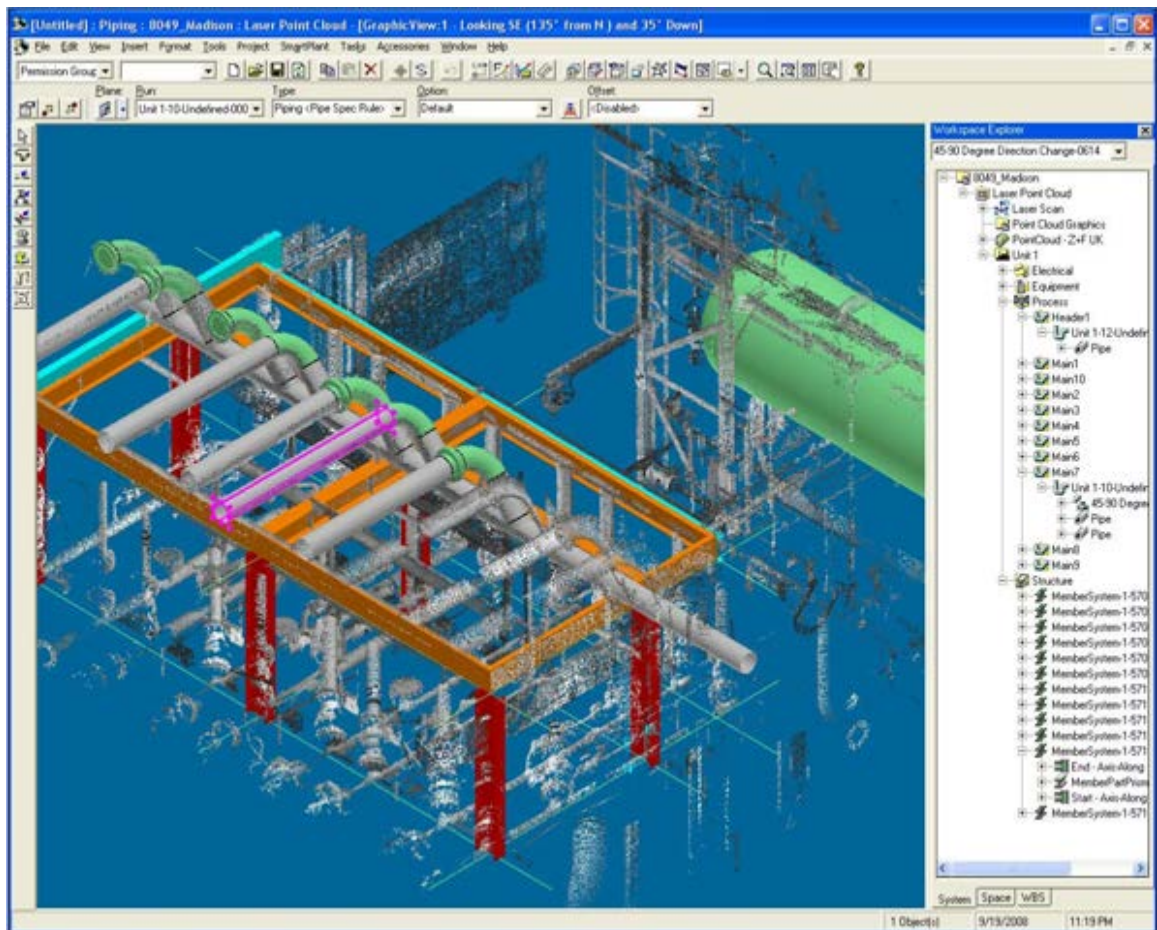
SECTION 1

Point Clouds

Point clouds are created by 3D laser scanners. These devices measure a large number of points on the surface of an object, and output a point cloud as a data file. The point cloud represents the visible surface of the object that has been scanned or digitized.


Smart 3D provides vendor-neutral point cloud data integration within the Model modeling software environment. Using point clouds saves redrawing an object, while still being able to add to it or build on top of it.

The following picture shows a point cloud and Smart 3D design objects. The **Workspace Explorer** shows the Laser Point Cloud along with other design objects. The toolbar includes a new menu, **Accessories (or Cloudworx when using Leica)**, that contains options from the third-party point cloud vendor.



Point Cloud Vendors

Smart 3D provides support for the point cloud vendors Trimble, Leica Geosystems, Quantapoint, and Z+F UK, however, only Leica Geosystems Cloudworx has been certified on Smart 3D 2014. All vendors provide interface software that allows existing conditions captured with laser scanners to be viewed in the design environment. Follow the directions in the point cloud vendor documentation for using their point cloud functionality.

 **NOTE** All clients referencing Z+F Point Cloud data need to turn off the Smart 3D hardware with the CoreDisplaySettings.ini file.

Accessing Point Cloud

The third-party software that provides the point cloud data, adds an **Accessories (or Cloudworx)** menu to the Smart 3D menus. From the **Accessories (or Cloudworx)** menu you can open the point cloud. You can also locate the point cloud in the filters.

Selecting a Data Point

To select a particular point in the cloud, press and hold the **CTRL+SHIFT** keys and click the data point. (Point selection, especially for measurements, should only be done in orthographic mode, not in Perspective.)

Measuring

You can measure point-to-point within the cloud and cloud point-to-3D object. Select **Tools > Measure**, or click on the toolbar.

Interference Checking (IFC)

You can use IFC on the local database to ensure the additions to the point cloud are good. Select **Tools > Check Interference**.

SECTION 2

Common Applications

Point cloud vendors add custom commands to the **Accessories** menu. When a point cloud is added to a Model through Project Management, the **Accessories** menu becomes active and you can use the provided commands. Each vendor has developed their own menus. Leica's menu is called Cloudworx instead of Accessories.

For example, the ability to modify the point cloud density or the colors of the points is a feature that is exposed by the vendors.

Add Custom Commands

When a point cloud reference is added to a Model through **Project Management**, point cloud vendors add custom commands to Common.

Point cloud vendor XML files add custom commands, for example, modifying cloud density or changing the point colors. The **Accessories** menu lists those commands.

Create Filters

If the third-party point cloud vendor software has been installed and registered, you can select point clouds using the **Filter Properties** dialog box. From the **System or Object Type** tab, you can select the point cloud only or the point cloud system.

Measure Point Cloud and 3D Data

You measure the surface distance between two point cloud data points, or one point cloud data point and a 3D point, just as you measure any other distances.

NOTES

- When measuring a distance, you must click two selection points to define the distance to be measured. Measuring should only be done in Orthographic mode, not Perspective.
- Simple measurements are on the toolbar. Click **Tools > Measure** to open other measurement modes.
- The distances display in the **Text** view.

SECTION 3

Project Management

The **Project Management** interface displays a hierarchical view of a model, including satellite locations, databases, permission group folders, and permission groups. You use the **Project Management** interface to select the point cloud model that is provided by a third-party point cloud application.

After you install the third-party point cloud software, you add the new point cloud model to **Project Management** by right-clicking in the interface and selecting **New Point Cloud Model Reference**. This command, and others relating to point clouds, are only visible when the third-party applications have been registered and are integrated with the software.

After you select the point cloud model, open Smart 3D and begin adding to the model.

Reference a Point Cloud

Through **Project Management**, the point cloud model is added to the **Smart 3D** model.

1. From the tree view hierarchy in the left pane, right-click the **Model** icon, and then select **New Point Cloud Model Reference**.
2. In the **Point Cloud Model Reference** dialog box, select the required point cloud vendor (For CloudWorx, Leica Geosystems Inc.) you want to reference, and click **Register**.

NOTE If you select CloudWorx project file as point cloud source while referencing a point cloud, then the rotation and transformation points are not honored.

Refer to *Using Reference Models > Point Cloud Model Reference > Reference a Point Cloud* topic in the *Project Management User's Guide* for more information.

Remove a point cloud reference

1. In the Project Management tree view, right-click the model icon, and then select **New Point Cloud Model Reference**.

*The **Point Cloud Model Reference** dialog box displays.*

2. Select the vendor to unregister, and then click **Unregister**.

SECTION 4

Interference Checking

Point clouds provide a new reference data type available through Smart 3D. Interference checking (IFC) supports the creation of interference checks between Smart 3D data and point cloud data.

IFC processes the contents of a model database by querying the objects based on their **LastModified** timestamp. When IFC starts processing, it queries objects using two time windows, one towards the future and one towards the beginning of time; that is, the time stamp of the first object in the model.

This process uses a query window whose time request varies from a couple of minutes to an hour. The search towards the future has a lag of a few minutes, such that areas with current edits happening are not looked at until some time has passed and the edits have settled.

Point Cloud data is considered reference data, similar to PDS and MicroStation reference files. For PDS and MicroStation reference files, IFC queries for changes every so often, asking if anything has changed since the last time the reference file was queried for changes. However, point cloud processing is different. With point cloud interference checking enabled, as each object from a time window is processed, it is also processed against the point cloud data to ensure that new objects are properly placed.

Checking Interferences


Interference checking (IFC) ensures that parts do not occupy the same volumetric space and that each part meets the design criteria for clearance. A successful interference check ensures that there is sufficient space around the parts so that they can operate properly, be serviced properly, and be easily installed or removed when necessary. The IFC process can look at all model data, including data from a referenced 3D model, referenced MicroStation and 3D AutoCAD files, and Point Clouds from third-party software with valid connections.

There are two methods for interference checking:

- Server-based interference checking called Database Detect. For more information, see *Server-Based Interference Checking (Database Detect)* (on page 15).
- Interactive interference checking called Local Detect. For more information, see *Interactive Interference Checking (Local Detect)* in the *Interference Checking Guide*, available from the **Help > Printable Guides** command in the software.

The major differences between the two methods are:

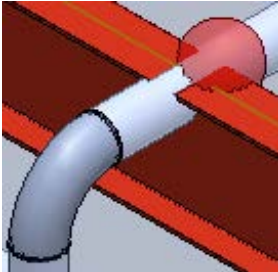
Database Detect	Local Detect
Runs continuously (System Administrator choice)	Works only within the current session
A dedicated server takes care of the IFC process, minimizing impact on users and	Provides immediate graphical feedback (works immediately after commit.)

improving performance	
Creates persistent interferences that are stored in the Model database	Creates temporary interference markers in a user session, which are not stored in the Model database. After you refresh the workspace, the temporary markers are removed
Based on administrator settings (controlled by permission groups)	Based on individual user settings
Provides feedback on how much has been checked in the entire model	Checks only created and modified objects in a session
Interference markers associate and come into the workspace along with the object participating in the interference	Clears dynamic interferences after refreshing workspace
<p> NOTE The Smart 3D - External Data option only checks Smart 3D objects against external objects.</p> <p>Smart 3D - External Data only checks for interference between two R3D external objects.</p> <p>IFC finds interference between R3D and R3D objects that belong to different R3D projects that participates in IFC.</p> <p>Smart 3D - Point Cloud option only checks objects against point clouds and Smart 3D.</p>	Finds interferences involving attached Reference 3D models (with option Interference Detection set to Participate) and objects in inserted 3D files (MicroStation dgn or AutoCAD dwg) in the workspace without requiring a specific setting.
Includes a referenced point cloud when the Smart 3D Point Cloud Compare option is selected in the Project Management interference checking settings.	Receives the point cloud specification via the File > Define Workspace workflow in Smart 3D when the Smart 3D Point Cloud Compare option is selected.

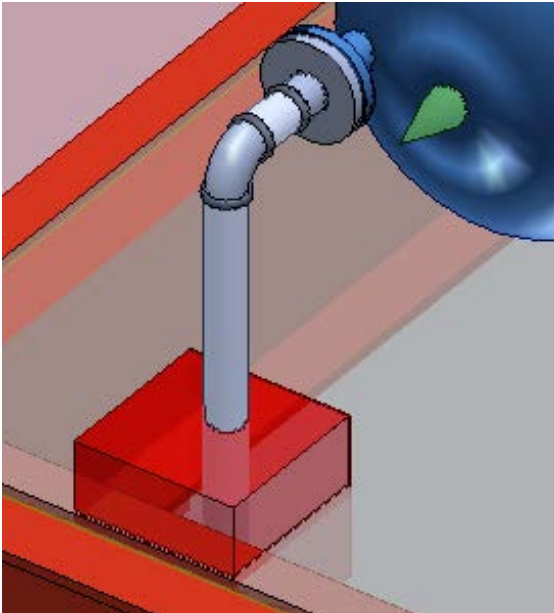
The Database interference checking objects, or markers, appear in the model until other objects are moved so the interferences no longer exist, or the aspects for the interference process are changed. It is not possible to delete an interference object in the same way you can delete other objects in the model. However, you can tailor the display to hide acceptable interferences.

How Interference Checking Results Appear

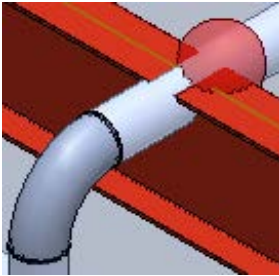
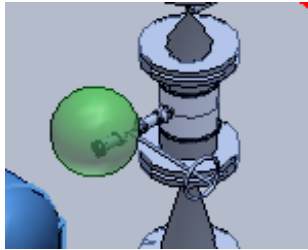
The Database Detect process marks any persistent interference with a spherical interference mark at the location of the interference. For example, the Database Detect service found an interference between this pipe and this beam, so it placed a spherical interference marker at that location.



The Local Detect process marks any interference it finds with a cube interference marker. For example, the software finds an interference and places a cube interference marker where there is an interference between a pipe and the floor.



For both processes, the color of the marker indicates the type of the interference: red for severe, green for clearance, and yellow for optional. You can modify the default interference marker colors with the **Format > Surface Style Rules** command. You can change the size of both the Database Detect and Local Detect interference markers using the **Marker size** option on the **Interference Server Setting** dialog box in Project Management task and the **Interference Checking Settings** dialog box in the Common task, respectively.

Severe Interference**Clearance Interference****Optional Interference**

You can clear the acceptable interferences from your workspace by changing the required action on the Interference List Dialog Box, and then editing the display properties on the Interference Checking Settings Dialog Box.

In general, the software checks the parts involved in interfering objects to find and report the interferences. For example, if you have a pipe run that consists of a pipe, an elbow, and a pipe, each intersecting another pipe. The interfering pipe intersects the pipe run at each of the three positions. The software generates three interferences, and then displays them in the **Interference List** dialog box.

If an object has an interference with two other objects, these interferences are listed as two separate interferences in the **Interference List**. You can view all possible associated interferences (selected aspects) of an interference by right-clicking the interference row in the **List** view. This action opens the **Interference Settings** dialog box, and you can then click **Other Aspects** to see a list of all the aspects at the interfering location.

NOTE When an object is brought into the workspace, all of its associated interferences appear, even if they are not part of the filter used to define the workspace.

If an object has a very large range, or if it is located in a dense area of the model, it may take longer to process all of its clash interferences. If the number of parts that the object has to check for clash interferences is greater than 2000, the object is categorized as a delayed part. During the processing phase, these delayed parts are skipped, and then they are reprocessed. If the number of parts that the object has to check for clash interferences is greater than 20,000, the object is categorized as a bad part. The delayed and bad parts are listed in the S3D Error log file.

NOTE An object is also categorized as a bad part if its range or geometry information are unobtainable for the aspects configured for clash detection. The **Properties** dialog box for the clash object describes why the part is bad, and how to resolve any discrepancies. For example, you may have to update the object or process a To Do List item for the object.

The range of values that determine whether or not an object is a delayed part are defined by the **RangeIntersectionObjCountMin** and **RangeIntersectionObjCountMax** registry entries. The registry entries are located in the Intergraph\Applications\Environments\FoulCheck\Settings\Remote folder. You can edit these values to fit your needs. However, editing these values may cause a significant lag in the interference checking process.

NOTE Review the delayed and bad parts for modeling issues and any errors that can result from the displayed object ranges for the aspects selected for interference checking.

Role of the Administrator

An Administrator can limit the access to interference checking to the proper permission groups. An Administrator sets up the options for the background interference checking at the beginning of the project and is the only one permitted to change these options. This capability requires that an Administrator have read access to all objects in the database for the background interference checking to work properly. Users do not need to have access to all objects. For more information, see the *Smart 3D Interference Checking Guide* available from the **Help > Printable Guides** command in the software.

The server-based interference checking process can only be started from a client machine on which both the **Project Management** and the **Database Interference Detection Process** options are installed. The Administrator can run the detection process on more than one model simultaneously on the interference server. When an Administrator starts Database Detect, progress and statistical information is displayed on the **Status** tab of the dialog box.

★ **IMPORTANT** Only an Administrator can start the Interference Detection Service (IfcNtSvc) on the system and set up the Interference Detection process (IFCProcess).

Interference Checking License Management

The interference checking process consumes one license to process five models. It releases a license for every five models that stop processing. For example, IFC consumes two licenses to process ten models, one license for processing Model1 through Model5, and then another for processing Model6 through Model10. Similarly, it releases a license after the sixth model stops processing, and then another after the remaining models stop processing.

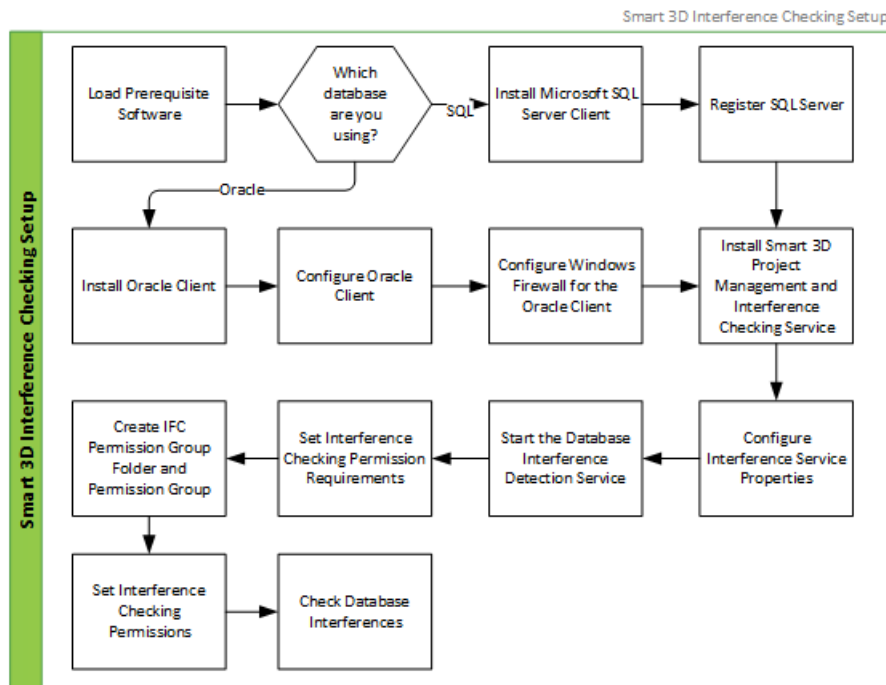
★ **IMPORTANT**

- The IFC service does not consume a license when it starts. It consumes a license only while processing the model.
- IFC consumes a license for every five models.
- IFC cannot process a new model if a new license is not available.
- You cannot set a number for processing models in the registry.

Server-Based Interference Checking (Database Detect)

Unlike the traditional file-based method of manually defining groups of parts to check against each other, **Check Interference** is a separate software process that runs directly on the Model database. Although the interference detection process can be run on any computer with the **Database Interference Detection Service** installed, due to the intensive nature of the interference check computations, the recommendation is to have a computer dedicated as the interference server.

NOTE In order to monitor interferences, you must install the **Database Interference Detection Service** option on the same computer that the **Project Management** option is installed.



Database detection options are set in the Project Management task. You can also start and stop the interference database detection process in the Project Management task.

Interference detection requires disk space for the file cache that temporarily stores the interference data. Before starting the interference process, the interference server checks to see if enough space exists in the TMP location for the file cache. The server also checks to see if you have the proper permissions to write, read, and delete files in the TMP location. During the process, if the space becomes too low, the software stops IFC, and then displays an error message. These checks primarily apply to the server-based interference process. Although, they can apply to the local checking process if extremely low or no disk space is available for the temporary folder on the local computer.

★ IMPORTANT Configure automatic disk defragmentation in order to free space for the file cache.


After you start the process, use the **Status** tab on the **Interference Server Settings** dialog box to monitor the start time, progress of the interference checking, time when the last part was modified, and the status of the checking. A box at the top of the dialog box identifies the model that you are checking.

The software automatically checks new or modified objects apart from existing objects. When you create or modify an object, the software checks for interference against all objects in the Model database. The interferences generated by this process are persistent; that is, the interferences are stored in the database like any other objects in the software. You can also modify these objects by changing the properties. Interferences are also assigned to a permission group; thereby the entire process is under the control and restrictions of an administrator.

You can interrupt the automatic interference checking process during a work session without forcing a recheck of all parts in the database when the process is brought back online. When you restart the interference check process, the software begins checking where it left off when the process went offline. However, if you change any of the options on the **Interference Server Settings** dialog box for Database Detect, all pre-existing interference checking processes are cleared from the database, and checking restarts from the beginning.

The server-based interference checking runs continuously. Therefore, you can perform an interference check at any time and view the interferences of interest that result from the background check by refreshing the workspace. After you have reviewed the interferences, you can remove an interference automatically from the database by editing the objects so that the interference no longer exists. You can then see the results of your edit by refreshing the workspace. Because certain types of interferences are allowable, you also have the capability to mark such interferences as acceptable.

Be aware that there is a four minute interval between the time you make your edits and the time that the database detect service rechecks the objects. After the database detect process reaches 100%, the software issues a query only every two minutes to locate newly modified objects. Therefore, it is possible that there is a six minute delay before a modified object is processed. We do not recommend changing the default four minute interval. However, if you are in **Project Management** with the **Interference Server Setting** dialog box open, press CTRL+SHIFT+F12 to change the default four minute interval.

 **NOTE** You must run the Database Detect process before running an interference report. The report is not intended to run on local interferences.

What do you want to do?

- *Install Database Interference Detection Service* (on page [17](#))
 - *Configure Interference Service Properties* (on page 18)
 - *Start the Database Interference Detection Service* (on page 18)
 - *Set IFC Permission Requirements* (on page 19)
 - *Create IFC Permission Group Folder and Permission Group* (on page 19)
 - *Set IFC Permissions* (on page 20)
 - *Check Database Interferences* (on page 20)
-

Install Database Interference Detection Service

Prior to installing the Database Interference Detection Service on a computer, verify that all prerequisite software has been installed. If you have an older version of the Database Interference Detection Service installed on your computer, remove it before loading the new software.

You must have administrator privileges on the computer to install the software.

1. Open **Control Panel**.
2. Open **Programs and Features**.
3. Select **Intergraph Smart 3D** from the list of installed software's.
4. Click **Change**.

5. Select **Database Interference Detection Service**.
6. Optionally, select **64-bit Services** if you want to install the 64-bit version of the interference detection service also.

★ **IMPORTANT** If you are running Oracle, you must install the 64-bit Oracle client on the computer running 64-bit interference detection.

7. Click **Update**.

📘 **NOTE** If you have not yet installed Smart 3D on the computer, see *Install Smart 3D Client Software* in the installation guide for detailed instructions.

Configure Interference Service Properties

1. Click **Start > All Programs (All Apps for Windows 10) > Intergraph Smart 3D > Database Tools (Windows 7 only) > Configure Interference Checking Service**.
2. In the **Configure Interference Service** dialog box, select your database type.
3. Select the site database server (Microsoft SQL Server) or the Oracle Service for the site database.
4. Select the site database on which the interference service is to run.
5. Click **OK**.

Start the Database Interference Detection Service

Prior to starting the Database Interference Detection Service, you must configure its properties. For more information, see *Configure Interference Service Properties* (on page 18).

1. Log on with Administrative privileges to the computer on which the **Project Management** and **Database Interference Detection Service** options are installed.
2. Open the **Control Panel**, and then double-click **Administrative Tools**.
3. In the **Administrative Tools** window, double-click **Services**.
4. Right-click either the **Smart 3D Interference Detection Service** or the **Smart 3D Interference Detection Service 64-bit**, and then select **Properties** from the shortcut menu.

★ **IMPORTANT** The 64-bit Smart 3D Interference Detection Service does not process Point Clouds. Use Reference 3D if you are running 64-bit IFC, or you can switch to a 32-bit IFC server to process Point Clouds.

5. On the **Log On** tab, select the **This account** option, and then type the user name that has Administrative privileges.

📘 **NOTE** This version of the software does not support the **Local System account** option.

6. In the **Password** and **Confirm password** boxes, type the password for the user account.
7. On the **Recovery** tab, set the **First failure**, **Second failure**, and **Subsequent failures** options to **Restart the Service**.
8. Set **Restart service after** to a minimum of 6 minutes.
9. On the **General** tab, verify that the **Startup type** is set to **Automatic**.
10. In the **Service status** section, click **Start**.
11. Click **OK**.

NOTES

- The interference checking service does not consume a license when it starts. It consumes a license only while processing the model. For more information, see *Checking Interferences*.
- Errors that are encountered during startup of the Database Interference Detection service are logged to the Event Viewer Application Log with the source name **IFCNTSvc**. The service can automatically recover from these situations:
 - network interruptions
 - lost database connection
 - the interference checking process runs out of memory
 - the interference checking process or service is terminated for any reason
- Do not run the 32-bit and 64-bit interference detection services simultaneously on a computer. IFC must only run as a single instance for the entire model.

Set IFC Permission Requirements

You must install the **Database Interference Detection Service** option in order to monitor interferences. For more information about installing and configuring this service, see the *Smart 3D Installation Guide* available from **Help > Printable Guides**.

★ IMPORTANT The user account running the IFC Windows service must have at least Read access to the SharedContent folder. Otherwise, IFC generates a bad part marker with clashes against structural fireproofing.

A Smart 3D Interference Detection Service icon is placed under the model node in the Project Management tree. After the proper access permissions are configured, you can start and stop the Database Detect process from any computer on which the Project Management option is installed.

The Smart 3D database hierarchy is comprised of a model configuration that consists of the model and catalog databases. For the IFC Database Detection process to run correctly, permissions must be set on the model and model permission groups according to the following guidelines:

Log on privileges for the IFC Administrator include:

- Read access on the model database at a minimum.
- Full Control permissions or access on a minimum of one permission group.

💡 TIP In the Project Management task, create a new permission group folder and permission group under the model icon to store the IFC results. For example, type **IFC Permission Group Folder** and **IFC Permission Group** in the **New Permission Group Folder** and **New Permission Group** dialog boxes, respectively. For more information, refer to *Create IFC Permission Group Folder and Permission Group* (on page 19).

- Read access on all other model database permission groups at a minimum.

Create IFC Permission Group Folder and Permission Group

1. Log on with administrative privileges to the computer where you have installed the **Project Management** and **Database Interference Detection Service** options.
2. In the Project Management tree view, navigate to the models icon.

3. Expand the models folder.
4. Right-click a model under the models folder, and select **New Permission Group Folder** on the shortcut menu.
5. Type **IFC Permission Group Folder** for the name of the new permission group folder.
6. Click **OK** to close the **New Permission Group Folder** dialog box.
7. In the tree view, navigate to the **IFC Permission Group Folder** icon.
8. Right-click the **IFC Permission Group Folder**, and select **New Permission Group** on the shortcut menu.
9. Type **IFC Permission Group** for the name of the new permission group.
10. Click **OK** to close the **New Permission Group** dialog box.

NOTE After the IFC permission group is created, you must assign the proper access permissions. For more information, see *Set IFC Permissions* (on page 20).

Set IFC Permissions


1. Log on with administrative privileges to the computer on which the **Project Management** and **Database Interference Detection Service** options are installed.
2. In the Project Management tree, navigate to the **IFC Permission Group** icon.
3. Right-click the **IFC Permission Group** icon, and select **Permissions**.
4. On the **Access Permissions** dialog box, click **Add**.
5. In the **Add names** grid, double-click in the **User** cell, and type the domain and name of the user or group to add.

TIPS

- You can also click **Add** and search for users using the **Select Users and Groups** dialog box. This is a common Windows dialog box. For information regarding the options in this dialog box, see your Windows documentation.
 - To remove a user or group from the **Add names** grid, select the appropriate row, and then click **Remove**.
6. In the **Type of access** list, select the type of access you want to assign. The software automatically updates the associated row in the **Add names** grid.
 7. Click **OK**.
 8. Click **OK** again to close the **Access Permissions** dialog box.

Check Database Interferences

Before performing the following procedure, you must first manually configure the Smart 3D Interference Detection Service on the computer with the service installed.

1. In the Project Management tree, right-click the **Interference Server** icon  under the model for which you want to start Database Detect. Then select **Properties** on the shortcut menu.
2. In the **Interference Server Settings** dialog box, assign interference checking priorities to aspects.

TIP **Maintenance**, for example, is a typical aspect listed in the **Aspect** column. If a check of this aspect is important, you can indicate the priority as **Required**. If **Maintenance** is low priority or not important, you can indicate the priority as **Optional** or **Not Checked**.

3. Specify the interference comparison criteria:
 - **Required - Required** - Defines interferences classified as hard/hard. For example, one pipe physically intersects with another pipe. Severe interferences are shown in red.
 - **Required - Optional** - Defines interferences that are not as severe and are classified as hard/soft. For example, one pipe overlaps the optional aspect of the other object. Optional interferences are shown in yellow.
 - **Optional - Optional** - Defines interferences that are not severe and are classified as soft/soft. For example, the maintenance aspect of one piece of equipment overlaps the maintenance aspect of another. Optional interferences are shown in yellow.
 - **Smart 3D - External Data** - Considers objects outside the active model for interferences. For Local Detect, this option is enabled by default. For Database Detect, this box must be checked if you want attached Reference 3D models, inserted MicroStation and AutoCAD files to be considered. This option only checks objects against objects in external references and also checks for interferences between two external R3D objects.
 - **Smart 3D - Point Cloud** - Considers Smart 3D objects and point cloud objects for interferences. For Database Detect, this option must be selected to consider Smart 3D objects and point cloud objects. For Local Detect, select the **Smart 3D Point Cloud** check box to consider local interferences. The point cloud must have a valid connection to the model with no unresolved vendor licensing issues for this check box to be available.
4. In the **Include clearance** list, select the needed clearance rule. Clearance interferences are shown in green.
5. From the **Assign results to permission group** box, choose the permission group to which all the detected interferences are assigned.
6. In the **Marker size** field, type the value for the size of the interference symbols that generate in the model.

TIP Choose a marker size that is clearly readable, but one that does not interfere with the smaller details in the workspace view.

7. Click **Start** on the **Database Detect** tab. After you click **Start**, the **Status** tab on the **Interference Server Settings** dialog box displays the progress of the processing for parts that existed previously and for new or changed parts during the run.

★IMPORTANT If the IFC Server detects that your system resources are too low (due to a significant process requiring the majority of system memory), then the IFC process stops and displays a message box notifying you that the service has stopped for this reason. The IFC process will automatically attempt to restart when it runs out of memory.

NOTES


- The Smart 3D Interference Detection service does not consume a license when it starts. It consumes a license only while processing the model. For more information, see
- To start the server interference detection process, you must have at least Read access to all objects in the model and Write access to the model itself. Access privileges are assigned for

each permission group in the Project Management task. During the IFC process, if the software denies access to an object, the server process stops and a message appears.

- To view the status of the database interference detection process, right-click the **Interference Server** icon in the Project Management tree, and click **Properties**. On the **Interference Server Settings** dialog box, click the **Status** tab.
- When the database interference check process is running, only the **Stop** command is available. When the process is not running, the **Start** command and all process property gadgets are available. The **Stop** command is not available.
- When the database interference check is running and you add any permission group without Read permissions for the server, the server automatically receives Read permissions and finds collisions with the placed objects in that permission group.
- When you modify permission groups in Project Management, the host for the existing, running task does not receive the changes. To update the information, you must exit and restart the interference detection process.

Database Detect Tab (Interference Dialog Box)

Provides options for assigning interference checking priorities to aspects, specifying the comparison methods, and optionally including a clearance rule. You can also assign the interference results to a selected permission group. All properties on this tab when viewed outside the Project Management task are read-only.

 **NOTE** You must run Database Detect before running the delivered Interference report. The Interference report is not intended to run on local interferences.

Server

Specifies the name of the server on which the interference checking is processed for the identified model.

Property

Specifies each aspect that you want to check. Lists all the object aspects that are identified for use in the mode, such as **Simple physical**, **Detailed physical**, **Insulation**, and **Maintenance**. This includes system-defined aspects and custom aspects.

Type

Defines the checking you can apply to the selected aspect: **Required**, **Optional**, and **Not checked**. Choose the appropriate type for each aspect. **Not checked** means the selected aspect is not used for interference checking.

Compare

Specifies the types of comparisons to perform to find interferences.

- **Required - Required** - Defines interferences classified as hard/hard. For example, one pipe physically intersects another pipe.
- **Required - Optional** - Defines interferences that are not as severe and are classified as hard/soft. For example, one pipe overlaps the optional maintenance aspect of the other object but does not actually intersect the other object.
- **Optional - Optional** - Defines interferences that are not severe and are classified as soft/soft. For example, the maintenance aspect of one piece of equipment overlaps the maintenance aspect of another.

- **Smart 3D - External Data** - Includes Reference 3D models, referenced MicroStation objects, and 3D AutoCAD files in interference checking. For Local Detect, the software by default considers objects in Reference 3D models, MicroStation, and 3D AutoCAD files that are in the workspace.

NOTES

- This option only checks active model objects against R3D external objects. IFC also checks clashes between R3D objects belonging to different R3D projects. The option does not check for interferences between other external objects such as MicroStation to 3D AutoCAD.
- Reference 3D models that contain tessellated data take a significant amount of time for interference checking to process. For quicker IFC performance, set **Interference Detection** to **Do Not Participate**.
- **Smart 3D - Point Cloud** - Includes an attached point cloud during interference checking. The point cloud must have a valid connection to the model with no unresolved vendor licensing issues for this option to be available.

Include clearance rule

Specifies the clearance rule to add to the **Required** type of interference check.

Assign results to permission group

Specifies the permission group to which all the detected interferences are assigned. The list displays only those permission groups to which the server containing the interference checking software has write access.

Marker size

Specifies the size of the interference graphic marker. Choose a size that is clearly visible, but one that does not interfere with the smaller details in the workspace view.

Start

Begins the Local Detect interference checking process. This option is only available in the Project Management task.

Stop

Stops the Local Detect interference checking the process. This option is only available in the Project Management task.

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